THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 36. SEPTEMBER 4th, 1954 VOL. 66.

ENZOOTIC ABORTION OF EWES

Adjuvant Vaccines prepared from Infected Ovine Foetal Membrane Tissues: The Resistance of Vaccinated Pregnant Sheep to the Inoculation of Virus

BY

A. D. McEWEN

MOREDUN INSTITUTE, GILMERTON, EDINBURGH

McEwen & Foggie (1954) found that a vaccine prepared from infected ovine foetal membrane tissue sterilised by formalin, precipitated by potassium alum and emulsified in mineral oil, stimulated a durable immunity in sheep : an immunity demonstrated by the presence of complement fixing antibody and neutralising antibody in the sera.

The present paper is concerned with the immunity of vaccinated gimmers that were served after vaccination and when pregnant inoculated with the virus of ewe abortion.

THE VACCINES

Two vaccines were used. The first vaccine has been described fully by McEwen & Foggie (1954), and consisted of one part of a 50 per cent. alum precipitate of infected ovine foetal membrane tissues emulsified in four parts of Falba and liquid paraffin leve B.P. (Falba one part, liquid paraffin four parts). The second vaccine was prepared from the same lot of precipitated tissue as the first vaccine, but the Falba was replaced by Emocithin,* two parts of Emocithin to 98 parts of liquid paraffin leve B.P. A cubic centimeter of each vaccine contained the same amount of precipitated tissue, but in the second vaccine there was a higher concentration of liquid paraffin.

EXPERIMENTAL SHEEP

Blackface gimmers obtained from Perthshire were used. The sera of all the sheep on entering the experiment were negative to the complement fixation test. The sheep were divided into eight groups and treated as follows :—

Groups 1 and 2.—Each sheep received a single subcutaneous injection of 1 c.c. of the vaccine prepared with Falba.

Groups 3 and 4.—Each sheep received two subcutaneous injections of 1 c.c., at 14 days interval, of the vaccine prepared with Falba.

Groups 5 and 6.—Each sheep received a single subcutaneous injection of 1 c.c. of the vaccine prepared with Emocithin.

Groups 7 and 8 were not vaccinated.

The first injection of vaccine was given on October 21st, 1953, and on November 19th the tups were turned into the field with the gimmers.

On February 3rd, 1954, the gimmers were each inoculated subcutaneously with virus.

In a hitherto unrecorded infection experiment groups of pregnant gimmers were inoculated subcutaneously with graded doses of virus and seven out of 10 animals inoculated with the highest dilution (10^{-7}) of virus contracted a uterine infection. The results of this experiment are summarised in Table I.

The challenge inoculations given to the pregnant gimmers on February 3rd were prepared from infected yolk sacs diluted 1 : 2,000 and 1 : 200,000. Each sheep received 1 c.c. subcutaneously of the appropriate dilution of virus.

In all infection experiments, including those reported by McEwen, Littlejohn & Foggie (1951), the infective dose has been prepared from the same preserved strain of virus at its second to fourth passage through eggs. The virulence of the strain may therefore be regarded as having been kept constant, and the smaller of the two challenge inoculations of virus given to the gimmers in the present experiment was a severe test and probably many times greater than that which would have caused a high incidence of uterine infection in non-immune animals.

From the inoculation of the challenge dose of virus until abortion or lambing the sheep were housed. The foetal membranes were examined macroscopically for lesions and, irrespective of whether lesions were present or not, smears were made from six areas of each set of foetal membranes, stained and examined for the virus of ewe abortion. The foetal membranes were examined from all but five of the pregnant sheep. They were not obtained from two sheep in Group 2 and from one sheep in each of Groups 4, 5 and 6. These sheep lambed normally and smears made from vaginal swabs showed no virus.

The results given by the vaccinated and control gimmers to the inoculation of virus are shown in Table II (*overleaf*).

The vaccinated sheep had a very satisfactory resistance to infection, but three infected pregnancies, terminating in abortion, occurred in Group 5, the only vaccinated animals that became infected. It may be noted that the sheep in Group 6, immunised with the same vaccine as Group 5, resisted infection although exposed to a larger infective dose of virus than that given to the animals in Group 5.

* Emocithin is made by W. A. Scholten's Chemische Fabrieken N.V., Foxlol (Gr.), Netherlands.

TABLE I

THE SUBCUTANEOUS INOCULATION OF PREGNANT GIMMERS WITH 1 C.C. OF DILUTED VIRUS

Dilution of Virus															
10^{-3}			10^{-4}			10^{-5}			10^{-6}			10^{-7}			
No. of pregnancies	Infected	Non-infected	No. of pregnancies	Infected	Non-infected	No. of pregnancies	Infected	Non-infected	No. of pregnancies	Infected	Non-infected	No. of pregnancies	Infected	Non-infected	
12	10	2	12	12	0	11	10	1	12	12	0	10	7	3	

Table II

Vaccinated and Control Pregnant Gimmers Inoculated Subcutaneously with Virus

Group	Dilution of virus in challenge inoculation	No. of gimmers in group	No. barren	No. of pregnancies	No. of non-infected pregnancies	No. of infected pregnancies	No. of infected pregnancies terminating in abortion
1. Single injection of vaccine prepared with Falba	1 : 2000	19 (2 killed by dogs)	2	15	15	—	—
2. ,,	1 : 200000	19 (1 killed by dogs)	2	16	16	—	—
3. Double injection of vaccine prepared with Falba	1 : 2000	18	1	17	17	—	—
4. ,,	1 : 20000	19	4	15	15	—	—
5. Single injection of vaccine prepared with Emocithin	1 : 2000	19	2	17	14	3	3
6. ,,	1 : 20000	19	4	15	15	—	—
7. Control	1 : 2000	18	2	16	3	13	11
8. Control	1 : 20000	19	0	19	4	15	9

On January 18th, 17 days before the inoculation of live virus, all the sheep had been bled. Sera were collected and individual samples were examined by the complement fixation test. Aliquots of individual sera from sheep in each group were pooled, filtered and stored at –20° C. and examined for virus neutralising antibody. The results of the complement fixation tests are summarised in Table III, and of the serum virus neutralisation tests in Table IV.

Table III

The Complement Fixation Titre of the Sera from Vaccinated Sheep Bled on January 18th, 1954

Group	Mean titre for group	Individual sera: Maximum titre	Individual sera: Minimum titre
1	746	2560	5
2	710	1280	80
3	524	1280	160
4	1730	10240	80
5	1333	2560	80
6	1267	2560	80

From Table III it is apparent that complement fixing antibody was produced as effectively by the sheep given the vaccine prepared with Emocithin as by the animals injected with vaccine prepared with Falba. As pointed out by McEwen & Foggie (1954), there is no proof that the complement fixing antibody of the heat stable antigen of the ewe abortion virus is related to or necessarily produced in parallel with the antibody that protects against infection with the virus. The same authors suggest that the presence of virus neutralising antibody in the serum of vaccinated sheep may be a truer indication of the animal's resistance to virus infection.

The technique and procedure in the serum virus neutralisation tests were similar to those formerly described (McEwen & Foggie, 1954), but in the present series of tests the serum virus mixtures were incubated at 37° C. for two hours. In brief, the serum virus mixtures were inoculated intranasally into mice : eight days later the survivors were killed and the degree of lung consolidation estimated : mice that died and showed extensive lung consolidation were given a score of eight : mice that were killed were given a score of one to eight according to the degree of lung consolidation if any were present. It had been noticed that mice with extensive involvement of the lungs lost weight from the fourth day. In these tests the groups of mice were weighed when inoculated and at intervals thereafter. In Table IV the mean weight of each group at the time of inoculation and the mean gain or loss of weight of the mice surviving to the eighth day are shown. The number of mice that died from the virus pneumonia is also recorded.

From Table IV there is the suggestion that vaccinated Group 5 serum neutralised virus less effectively than did the sera from vaccinated Groups 1 and 3.

In the test on the sera from vaccinated Groups 2, 4 and 6, and the control Group 8, Group 6 serum neutralised as effectively as Group 2 serum.

At the test in which sera from Groups 1 and 2 (single injection of vaccine prepared with Falba), sera from Groups 5 and 6 (single injection of vaccine prepared with Emocithin) and serum from control Group 7 were compared, the result confirmed the suspicion that Group 5 serum was less effective than sera from Groups 1, 2 and 6.

As the sheep in Groups 5 and 6 were immunised with the same vaccine it is probable that the less effective neutralisation by Group 5 serum, and the three cases of uterine infection and abortion in this group were attributable to a poor immunological response by some of the animals in the group and not to the vaccine they received being less antigenic than the vaccine given to Groups 1 and 2.

Although the vaccinated gimmers developed an immunity and resistance to infection, 15, or 12 per cent., of these as compared to 2, or 5·9 per cent., of the control animals were barren. The relatively high incidence of barrenness in the vaccinated animals calls for comment. It may have been caused by dogs worrying the sheep on several occasions soon after the tups were introduced into the flock, when three of the gimmers were killed and others wounded by dogs. On the other hand it might be suggested that the injection of a water-in-oil emulsion of the homologous foetal membrane tissue had called forth in some animals an immunological or pathological response that caused the early death of the embryo. Such a possibility is suggested by the facility with which encephalitis was produced in monkeys by the subcutaneous injection of homologous central nervous tissue emulsified in mineral oil (Kabat, Wolf & Berger, 1947 ;

Morgan, 1947) and in sheep by the intramuscular injection of water-in-oil emulsions of homologous brain tissue (Innes, 1951).

In the summer and autumn of 1953 an emulsion vaccine, in all respects the same as the vaccine prepared with Falba and given to the experimental gimmers, was used in infected flocks. Returns have been received from 179 of the vaccinated flocks giving information on 23,658 vaccinated gimmers and 14,261 vaccinated ewes. The gimmers were vaccinated for the first time in 1953. The ewes had been vaccinated before, in 1952, with the "watery" vaccine described by Littlejohn, Foggie & McEwen (1952).

On the return, questions were asked regarding the number of lambings and abortions in the flocks, but none was asked concerning the incidence of barrenness. Information was, however, given on the number of barren animals by nine owners, and five of them did so because they considered the incidence in the vaccinated animals higher than they would normally expect. Figures from the nine flocks show that of 1,127 vaccinated gimmers 32 or 2·9 per cent. were barren, but the data given by the five owners who complained of barrenness show that of 689 vaccinated gimmers 25 or 3·6 per cent. were barren. Non-vaccinated gimmers were not kept in these flocks, but one of the nine owners reported that 5 of 147 vaccinated and 6 of 174 non-vaccinated ewes in his flock were barren.

In considering these figures it should be recalled that in 170 flocks containing 36,645 vaccinated sheep the incidence of barrenness called forth no comment. It is concluded that vaccination cannot be held responsible for barrenness.

It may be noted that the lambs born to and suckled by the experimental vaccinated gimmers remained healthy and

TABLE IV

NEUTRALISATION TESTS

SERA

Dilution of virus	No. mice	Deaths	Mean pneumonia score	Mean weight on 1st day	Mean gain or loss in weight of survivors
*Group 1. Single injection vaccine prepared with Falba					
1 : 320	40	0	0·7	19·7 grammes	+1·9 grammes
1 : 160	20	0	0·45	17·55 grammes	+2·5 grammes
†Group 2. Single injection vaccine prepared with Falba.					
1 : 320	20	0	0·92	20·6 grammes	+1·35 grammes
1 : 640	20	0	0·1	21·0 grammes	+2·65 grammes
‡Group 1. Single injection vaccine prepared with Falba					
1 : 640	40	0	0·25	20·97 grammes	+1·9 grammes
*Group 3. Double injection vaccine prepared with Falba					
1 : 320	40	0	0·075	18·6 grammes	+1·9 grammes
1 : 160	20	0	0·05	18·2 grammes	+3·5 grammes
†Group 4. Double injection vaccine prepared with Falba					
1 : 320	20	0	0	20·6 grammes	+1·6 grammes
1 : 640	20	0	0	21·95 grammes	+2·25 grammes
‡Group 2. Single injection vaccine prepared with Falba					
1 : 640	40	1	0·95	21·97 grammes	+1·35 grammes
*Group 5. Single injection vaccine prepared with Emocithin					
1 : 320	40	0	1·3	19·22 grammes	+1·35 grammes
1 : 160	20	0	0·7	18·85 grammes	+1·45 grammes
†Group 6. Single injection vaccine prepared with Emocithin					
1 : 320	20	0	0·05	19·95 grammes	+1·25 grammes
1 : 640	20	0	0·15	21·6 grammes	+2·25 grammes
‡Group 5. Single injection vaccine prepared with Emocithin					
1 : 640	40	1	2·37	21·35 grammes	—0·32 grammes
*Group 7. Controls					
1 : 320	40	9	5·2	19·9 grammes	—4·2 grammes
1 : 160	20	0	2·85	18·2 grammes	—1·0 grammes
†Group 8. Controls					
1 : 320	20	5	6·5	20·5 grammes	—3·3 grammes
1 : 640	20	3	4·0	20·6 grammes	—3·4 grammes
‡Group 6. Single injection vaccine prepared with Emocithin					
1 : 640	40	0	0·45	21·5 grammes	+1·5 grammes
‡Group 7. Controls					
1 : 640	20	3	5·05	21·75 grammes	—4·4 grammes

* Sera from Groups 1, 3, 5, and 7. † Sera from Groups 2, 4, 6, and 8. ‡ Sera from Groups 1, 2, 5, 6, and 7. All tested at the same time against the same sample of virus. Comparison should be made between sera tested at the same time.

See Errata - p. 532.

normal, and no reports were received from the field of early illness or loss of lambs born to vaccinated gimmers or ewes. Nothing analogous to Rh antibody was stimulated by the blood present in the tissue used in making the vaccine.

Summary and Conclusions

Sheep injected with vaccine consisting of a water-in-oil emulsion of alum precipitated infected ovine foetal membrane tissue develop an immunity that confers a high degree of resistance to the inoculation of the ewe abortion virus during pregnancy.

Emulsion vaccines prepared with either Falba or Emocithin as the emulsifying agent are equally antigenic. Emocithin may be purchased with sterling and on that account is preferable to Falba or other emulsifying agents obtainable only with dollars.

No adverse immunological or pathological reactions follow the injection of female breeding sheep with vaccines prepared from infected ovine foetal membrane tissues emulsified in mineral oil.

Acknowledgments.—It is a pleasure to express my indebtedness and sincere thanks to my colleague, Dr. Angus Foggie, who was responsible for the complement fixation tests, the results of which are reported in this paper ; to Mr. J. B. Dow, F.I.M.L.T., for valued technical assistance and the preparation of the vaccine used in quantity in the field during 1953 ; to Mr. W. Buist for carefully shepherding the experimental sheep and collecting for examination all but five of the foetal membranes from 135 gimmers ; and to Mr. T. A. Watson, PH.C., Messrs. T. & H. Smith, Ltd., Manufacturing Chemists, Edinburgh, for his most helpful suggestion to use Emocithin which led to this agent being found a suitable substitute for Falba.

References

Innes, J. R. M. (1951). *J. Comp. Path.* **61.** 241.
Kabat, E. A., Wolf, A., & Berger, A. E. (1947). *J. Exp. Med.* **85.** 117.
Littlejohn, Annie, Foggie, A., & McEwen, A. D. (1952). *Vet. Rec.* **64.** 858.
McEwen, A. D., & Foggie, A. (1954). *Ibid.* **66.** 393.
———., Littlejohn, Annie, & Foggie, A. (1951). *Ibid.* **63.** 489.
Morgan, I. M. (1947). *J. Exp. Med.* **85.** 131.

EMERGENCY SLAUGHTER OF FOOD ANIMALS

***Part of a paper read at the Health Congress of the Royal Sanitary Institute by**

J. NORVAL
Veterinary Inspector, City of Edinburgh

Introduction

The term emergency slaughter should apply only where immediate slaughter of a sick or injured animal is carried out in order to salvage the carcase. During the war years and post-war period the definition broadened and now includes to a large extent animals which are suffering from some chronic illness and which are consigned alive by farmers to the abattoir as " casualties." Accordingly this paper will deal largely with the handling, slaughter and inspection of this large group.

Table I is compiled from figures published by the Ministry of Food (Statistics and Intelligence Division, Meat) and it shows the number of each class of food animal which have been slaughtered in Great Britain as casualties during the period 1948–52. It is to be noted that a proportion of them do pass through the Grading Centre. I have expressed the number of casualty cattle, sheep and pigs as a percentage of their respective total kill.

* The original paper included the following sections : Introduction, Legal Aspects, Administration, Slaughter on the Farm, *Ante-mortem* Inspection, Types of Casualty, Examination and Judgment of Carcase, Prevention of Casualties.

Types of Casualty

It is understandable that casualties arriving at an abattoir vary with the type of agriculture carried on in the surrounding neighbourhood. In Edinburgh we receive large numbers of pig casualties from the many piggeries around the city. Short lists are given of the common findings in casualties slaughtered here during three separate years.

Cattle

	1947	1951	1952
(*Actual total for the year*)	(124)	(138)	(74)
Tuberculosis	38·5	6·5	8·0
Johne's disease	3·5	27·5	29·5
" Paraplegia "	9·5	7·5	12·0
Fracture	4·0	9·0	6·5
Actinobacillosis	4·5	6·5	6·5
Mastitis	14·0	22·0	8·0
Metritis	4·0	4·0	8·0
Pneumonia	5·5	3·5	2·5
Peritonitis	4·0	3·0	6·5
Septic pericarditis ...	1·5	1·0	1·0

The outstanding feature of these figures is the marked fall in the number of tubercular cases and the rise in the number of animals affected with Johne's disease. The majority of the " paraplegia " cases are cows which have failed to regain their feet following milk fever, and on *post-mortem* they invariably show marked bruising of the subcutaneous tissue and a very fatty liver. Other cases result from slipping in the byre and on *post-mortem* marked haemorrhage

Table I
England, Wales and Scotland

Year	Cattle: From farm to abattoir	Cattle: From grading centre to abattoir	Cattle: Percentage to total killed	Sheep: From farm to abattoir	Sheep: From grading centre to abattoir	Sheep: Percentage to total killed	Pigs: From farm to abattoir	Pigs: Percentage to total killed
1948	62,978	15,277	5·13	56,040	7,954	1·12	40,366	6·87
1949	64,633	14,019	5·13	68,291	7,425	1·21	64,204	5·32
1950	61,429	13,789	4·00	65,972	10,314	1·15	86,944	5·71
1951	53,883	12,187	3·31	72,577	9,749	1·48	147,673	8·66
1952	46,179	9,506	3·15	78,149	11,245	1·31	158,963	7·14

is found in the adductor muscles of the hind limb. In some cases there is necrosis of these muscles and, if the animal survives, this may then be replaced by fibrous tissue, a condition more often seen in sow carcases.

The average incidence of actinobacillosis in "normal" animals is 0·8 per cent. with lesions six times as common in the structures of the head as elsewhere (*e.g.*, rumen, oesophagus, etc.). Because the fattening period is inevitably prolonged, there is a marked increase in cases after the bulk of cattle have been graded, either from the grass or courts (*e.g.*, 2·5 per cent. in March, April and May, 1949).

Mastitis cases now seem to be most commonly dispatched for slaughter when the farmer is unable to strip secretion from the teats, and roughly 25 per cent. of such carcases are condemned. Acute metritis cases are invariably accompanied by marked toxaemia and heavy mixed infections in the uterus. Records show that all affected animals were condemned in 1951 and 1952. Pneumonia is found chiefly in recently landed Irish cattle, especially in the winter months after a rough sea voyage—so-called "transit fever"—and of these very few of the carcases are fit for food unless the decision to slaughter is made early. The origin of simple peritonitis is not always apparent, but septic lesions are most commonly associated with multiple abscesses in the liver. Large abscesses are often found between the caudate lobe and the right kidney. Foreign bodies, *e.g.*, nails, pieces of wire, are discovered frequently in the reticulum, but usually they seem to set up only a local peritonitis or abscess in the stomach wall and a glance at the table shows the small incidence of traumatic pericarditis.

Calves

I have not tabulated the cause of emergency slaughter in calves, as many are sent in to the abattoir not for disease but for economic reasons. In genuine casualties the most common lesion encountered is an enteritis and this almost invariably results in a fevered carcase. Generally *Bacterium coli* can be recovered from all parts of the carcase, including the joints and bone marrow. In this connection the possibility of salmonella infection must not be overlooked and generally speaking the judgment of calf carcases tends to be more severe than with any other class of food animal.

Sheep

	1947	1951	1952
(*Actual total for the year*)	(73)	(205)	(232)
Arthritis	23·0	17·0	21·5
Pneumonia	15·0	10·5	19·0
Emaciation	15·0	15·5	12·5
Sepsis	7·0	4·5	6·5
Sheep worrying	—	6·5	6·5
Fractures	2·5	5·0	5·5
Entero-toxaemia	10·5	11·5	5·0
Mastitis	2·0	2·5	1·5
Metritis	5·0	5·0	2·0
Pregnancy toxaemia ...	4·0	2·5	3·0

As Edinburgh is not situated in a breeding area, we do not receive the large number of sheep casualties which are normally received in such areas for conditions associated with pregnancy, *e.g.*, pregnancy toxaemia, prolapse, dystocias.

Our figures show that arthritis is the most common finding, and the joints most commonly affected are the stifle, knee and hock. Usually there is marked exostosis round the latter two joints, with atrophy of the limb or limbs. *Erysipelothrix rhusiopathiae* has often been cited as the causal organism, but by the time these affected sheep reach the abattoir the joints are invariably sterile. The disease causing emaciation are many, *e.g.*, scrapie, severe parasitic infection Johne's, mineral deficiency, etc., and many sheep thus affected are sent to Grading Centres, where they are classified as "manufactures" (23,880 in 1952). Pneumonia and pleurisy associated with *B. purifaciens* infection is very common in "normal" sheep and it has always been a source of wonder to me how these animals retain their bodily condition. Casualty sheep invariably show a more acute lung lesion whether caused by this infection, Pasteurella, *Corynebacterium pyogenes* or streptococci. Recently *B. necrophorus* has been isolated several times from lungs, and in two such cases this organism was recovered in pure culture from brain "abscesses" which were discovered on splitting the skull. Paralysis of the hindquarters is frequently caused by a spinal abscess associated, in lambs, with a staphylococcal infection, and in older sheep with *C. pyogenes*. The figures for sheep worried by dogs vary slighty from year to year as does the severity of the damage. Many sent in are only slightly torn, nevertheless the farmer acts wisely, because in my experience gangrene starts very quickly in bite wounds in this animal. In the early war years entero-toxaemia cases were very common during autumn and winter in this abattoir and resulted in big losses in sheep being heavily fed on turnips, etc., but with the increased use of vaccine against this disease cases are now very much fewer. All sheep which have died during transit to the markets or slaughterhouses (average for 1950–52 was 0·03 per cent. of the total) are examined for anthrax before disposal. In this paper I feel I should mention also my experience with Irish lambs imported during the summer months. On arrival at the abattoir they are very thirsty, but if allowed access to water many of them will die. They seem to be markedly dehydrated and the slaughtermen find them difficult to skin. In my opinion there seems to be considerable cruelty attached to the importation of these young lambs and that an investigation into this practice is definitely necessary.

Pigs

	1947	1951	1952
(*Actual total for the year*)	(172)	(567)	(820)
Pneumonia (acute) ...	18·5	24·5	35·0
Arthritis	22·0	21·5	17·0
Sepsis	28·0	24·0	20·5
Fractures	4·5	5·5	5·5
Erysipelas	5·0	8·0	11·5
Mastitis	5·0	0·5	1·5
Metritis	0·5	1·5	0·5
Hernia	1·0	3·0	1·0

The figures for pigs reveal that pneumonia is the most common finding in casualties, but the lesion is so common in the abattoir among "normal" pigs that the significance in relation to emergency slaughter is difficult to estimate. Pneumonic lesions vary in extent and severity but do not usually require any seizure of the carcase, except where causal organisms set up an acute septic or gangrenous lesion in the lung, when ribbing out or total condemnation are the only courses of action. Arthritis is also very common and is generally associated with an old standing erysipelas infection although, as in the sheep, it may be difficult to demonstrate the organism at the time of slaughter. The weight of pork seized for arthritis in bacon pigs is not large, but this condition must be responsible for preventing many pigs from reaching bacon weight in the usual time. The most common joint involved is the stifle, less frequently the hip and the elbow; the first is dealt with by removing the shank above the level of the joint involved, which is left intact. When marked atrophy is present the

whole hind leg is invariably condemned and in the sow and boar this may be quite a large loss.

A study of the table indicates that approximately 25 per cent. of casualty pigs show abscess formation in some part of the body. These lesions may vary considerably in size and number. The commonest cause would appear to be wound infection as a result of fighting, coarse handling, or feet lameness with subsequent spread throughout the body, although at the time of slaughter the original wound may have healed. From experience I would say that pigs are fairly susceptible to pyaemic infection, especially during hard weather or when resistance is lowered, *e.g.*, as in a sow after rearing a large litter. Quite frequently carcases are examined where superficial abscesses have spread into the regional lymph glands. Variations in the degree and directions of spread are possible from the above to lesions involving one or more of the following organs : liver, kidneys, lungs and central nervous system. Generally the characteristic pyaemic foci are found and *C. pyogenes* is the most common organism isolated. The incidence of brain abscesses is 3·5 per cent.

" Scirrhous cord " is a regular feature in casualty pigs (4·15 per cent.). The infection is established about the time of castration and eventually results in the formation, in the area of the scrotum, of a large fibrous mass containing varying amounts of pus. Occasionally the infection may track along the inguinal canal to set up a series of abscesses in the groin and peritoneal cavity. The latter, however, commonly shows a number of abscesses of which the origin is obscure, and it may be that foreign bodies, *e.g.*, bristles from a brush penetrating the gut wall, may be a cause. Large granulomatous masses are often seen in the sow's udder, but normally local seizure is all that is necessary.

Despite the grossness of the anatomy of the pig skeleton fractures are quite common and the femur is the bone most frequently involved. Fracture of the vertebrae is often associated with the use of too heavy a boar for service. Multiple fractures are seen when a pig falls from a lorry while the vehicle is in motion.

The figures given for pigs affected with erysipelas include all forms of the disease except arthritis, to which I have referred earlier. Pigs with the typical skin " diamonds " respond so well to serum or antibiotic treatment that I consider it a better procedure to treat these animals rather than send them in as casualties. Occasionally a pig slaughtered with " diamonds " appears fevered after dressing and must be condemned. Less severely affected animals may require only seizure of the skin and trimming of the subcutaneous fat.

Dystocia cases on arrival at the abattoir invariably show the presence of one or two dead and decomposing piglets in the uterus, and I have little hesitation in condemning such carcases. In the sow an acute pyaemic nephritis caused by *B. coli* is sometimes encountered. Scrotal or umbilical hernias are occasionally the cause of emergency slaughter, but favourable judgment can be given unless strangulation of the bowel has been present for some time.

I have made no mention of swine fever carcases as I find the incidence of this disease varies so markedly from year to year, nor have I included in the above table any pathological material arising from " healthy " in-contact pigs licensed from swine fever premises. Had I done so for 1951, the figures, *e.g.*, for pneumonia, would have been considerably higher and would have given an entirely false picture.

All casualty pigs are examined for swine fever ulcers in the caecum as a routine and any pigs sent in on licence from infected premises are similarly treated. The meat inspector can give the Ministry of Agriculture Veterinary Services valuable assistance not only in discovering new outbreaks of the disease, but also in obtaining material suitable for confirmatory diagnosis. The caecum is the most convenient part to examine, but probably the most typical ulcers are found in the first yard of the colon.

The Examination of Casualties

All casualties are given the routine examination as laid down in the Public Health Meat Regulations, 1932, and, in addition (in most cases routine), bacteriological examination is made, I would emphasise the importance of exposing the kidney. incising the udder and uterus, and, if no *ante-mortem* examination is made, the exposure of the brain and spinal cord.

Routine bacteriological examination for members of the coli-typhoid group was started roughly three years ago and, following the report by Field regarding his findings in knackery animals, it was decided to culture the bile of each animal.

MacConkey Bile Salt Medium is used, and after overnight incubation any carcase which shows the presence of non-lactose fermenting colonies in the bile is detained and further tests carried out on the body musculature and lymph glands. With such facilities it is also possible to identify reasonably accurately other infections encountered during routine meat inspection work. Accurate determination of the *p*H of muscle does little to help in the judgment of carcases owing to the variation of muscle acidity in " normal " animals.

Judgment

It is generally accepted that the carcases of emergency slaughtered animals are of the greatest importance from the food poisoning aspect and their judgment places a heavy responsibility on the meat inspector. Carcases affected with salmonella septicaemia in particular are very dangerous and the idea that cooking will sterilise the flesh should never be countenanced, as the heating of some meat products, *e.g.*, sausage, before being consumed is often very inadequate. In addition, these carcases can be the source of infection to other meat and meat products.

If a person wishes to become proficient in meat inspection he must develop special powers of observation which can only be acquired by working in the abattoir. Unfortunately, a septicaemic carcase might show very little abnormality or be masked by other diseased conditions and consequently routine bacteriological testing is the only reliable method of detecting such a case. The following table shows the number of cases in which pathogenic members of the coli-typhoid group has been isolated in this abattoir.

		Salmonella		Paracolon	
Year	Number of cultures	Septicaemia	Localised in bile	Septicaemia	Localised in bile
1950	126	One (1) ox (*Sal. typhimurium*)	One (1) pig (*Sal. cholerae suis*)	—	One (1) pig
1951	718	One (1) pig (*Sal. cholerae suis*)	Two (2) pigs (*Sal. cholerae suis*)	One (1) ewe	One (1) sheep One (1) ewe Two (2) pigs
1952	1,049	Two (2) pigs (*Sal. cholerae suis*) One (1) calf (*Sal. dublin*)	Three (3) pigs (*Sal. cholerae suis*)	One (1) cow	Two (2) sheep Two (2) pigs One (1) cow

(*Concluded on page* 511, *col.* 1).

THE USE OF THE CUBONI TEST FOR EVIDENCE OF PREGNANCY IN MARES AND SOWS

BY

E. F. LEWIS

Department of Medicine, Royal Veterinary College

Introduction

During the past four years, Cuboni tests for evidence of pregnancy have been carried out on samples of urine submitted by a number of veterinary surgeons in Southern England. These samples were obtained from both mares and sows generally at the optimal stages in gestation of not less than 100 days in the mare, and 30 to 33 days in the sow. An attempt was made to assess the accuracy of the test by correlating positive answers with physical findings at the end of the gestation period. A high proportion of the tests carried out yielded negative findings and information on many of these, especially in the case of pigs, was difficult to obtain. The urine samples were obtained from thoroughbred, hunter and light horse types of mares, and most of the common breeds of pigs. The ages of the animals concerned spanned the normal breeding life for each species.

Technique

The techniques used in carrying out the tests were identical with those described by Cole & Hart (1932) for the mare, and Roth *et al.* (1941) for the pig. Very little difficulty was encountered in reading the result of the test in the case of mare's urine, but despite the use of alkaline zinc sulphate described by Roth for the removal of material capable of producing false positive results, the urine of pigs gave considerable trouble. A further problem was provided by the unreliable supply of direct sunlight by which the test is most easily read. A high-intensity, low-voltage, microscope lamp fitted with a condenser system was substituted and proved satisfactory. Attempts to facilitate readings by the use of comparing and contrasting light filters were abandoned when it was found that the accentuation of green colour lent itself to falsely positive interpretations.

The test was normally carried out in narrow test-tubes to provide a reasonable column of material, but reflections from the curve of the tube's surface hampered the reading, and positioning of the tube to catch reflected light from the optimal angle was very critical. It is hoped to carry out the test in flat narrow containers to give a thin, even area of material and to try standardising the reading by photometric means. It was found to be important to avoid reflections, however slight, from green surfaces in the vicinity of the tube.

Results

	Mares	*Sows*
Total number of samples ...	54	34
Positive test results	18	24
Positive results found correct ...	16	13
Positive results found incorrect	2	11
Negative test results	36	10
Negative results found correct...	36	7
Negative results found incorrect	—	3

Discussion

Of a total number of 208 tests carried out, detailed information was made available in only 54 cases. The greater proportion of samples received gave negative results. This, however, is to be expected when tests are used to provide answers in the face of doubtful clinical findings.

The results obtained with mares' urine were felt to be satisfactory. In two cases positive answers proved inaccurate, but no evidence has been received that a negative test result proved erroneous. On two occasions an indefinite or weak positive result was recorded when samples had been taken too early in the gestation period. Further samples were requested and both proved negative.

The results with pigs' urine were disappointing and confirmed, if only in a limited degree, the findings of Grunsell & Robertson (1953) whose work was based on the examination of 375 samples correlated with careful clinical recording.

The percentage of inaccuracy in both positive and negative results was high. One surprising feature noted on several occasions was the inaccuracy of the Cuboni test in urine samples yielding the most markedly positive results. The possibility of abortion or resorption of foetuses in the sow being responsible for some of these errors can neither be eliminated, nor, unfortunately, proved under field conditions. If, however, the test in the sow approached the accuracy obtained in the mare, an unusually high degree of abnormality in the breeding history of gilts and sows would have to be accepted.

Conclusions

The accuracy of the Cuboni test for evidence of pregnancy in the mare is sufficiently high to warrant its continued use as an aid to clinical diagnosis.

The degree of inaccuracy of the test in the case of swine is, however, too high to warrant its use as a routine test.

References

Cole, H. H., & Hart, G. H. (1932). *J. Amer. Vet. Med. Assn.* **33.** 604–614.

Roth, S. Y., Mayer, D. T., & Bogart, R. (1941). *Amer. J. Vet. Res.* **2.** 436–438.

Grunsell, C. S., & Robertson, A. (1953). *Vet. Rec.* **65.** 366.

(*Contd. from p.* 510).

The table shows that the incidence of salmonellosis is quite low, but I am satisfied that this extra work is necessary as, by ordinary meat inspection standards, at least three of these septicaemic carcases would have been passed as fit for food. Having had experience of meat inspection with laboratory facilities, I can state quite definitely that the doubtful cases associated with infective conditions can be judged with much greater confidence.

The carcases, if free from the specific diseases, are judged by (*a*) efficiency of bleeding and setting, (*b*) the presence of pyaemia or toxaemia, (*c*) bodily condition, and (*d*) presence of abnormal odour.

Prevention of Casualties

This is indeed a very large subject, but I only wish to tabulate a few recommendations which, in my opinion, would reduce the number of casualties.

(*a*) Loading banks should be provided at all farms and markets to aid loading and unloading and to prevent fractures.

(*b*) The widespread vaccination of pigs against swine erysipelas should be encouraged.

(*c*) Great care should be taken in preventing wounds in pigs and, if they occur, greater care should be taken in their treatment. Pigs recently castrated should not be allowed access to swill until their wounds heal, and sows which have reared a litter should not be turned out with other sows in an open yard, ankle-deep in mud.

(*d*) Paraplegia cases should be well-bedded to prevent bruising and bed sores, and this is practically impossible in the bovine unless the animal is moved from the byre to a loose-box.

CLINICAL COMMUNICATION

OBSERVATIONS ON THE TREATMENT OF FIELD CASES OF ANAPLASMOSIS IN JAMAICA USING THE DRUG PAA-701*

L. T. McDONNOUGH

Veterinary Division, Department of Agriculture, Jamaica, B.W.I.

Introduction

Anaplasmosis was first definitely diagnosed in Jamaica in 1938 although it must have existed long before that time. Thereafter many cases have been diagnosed each year in all types of cattle in which there has been severe mortality.

Several drugs have been used in an effort to cure or mitigate the disease, of which the most important during recent years have been :—

1. *Aricyl* (Disodium salt of acetarsonic acid ≡ 0·015 gramme As. per ml.).
2. *Acetylarsan* (Diethylamine acetarsol ≡ 0·05 gramme As. per ml.).
3. *Socium cacodylate* (U. S. P.).
4. *Forbisen* (an experimental drug developed by Squibb Laboratories).†

With each of these drugs a number of cases recovered, but although accurate records are not available, it is probable that there was no more than a 30 to 40 per cent. recovery rate using any one drug, a rate not greatly in excess of that expected in untreated animals.

In most cases these drugs were supported by blood transfusions, and in nearly every case symptomatic treatment for constipation was carried out. The general opinion was that none did more than stimulate the natural resistance of the animal.

During 1952, Felsenfeld and his co-workers of the Tropical Research Foundation, Chicago, engaged in investigational work in Jamaica, suggested that the experimental antiprotozoan drug PAA-701 might be effective in cases of anaplasmosis, since it had proved useful in other protozoal diseases.

Treatment of Field Cases with PAA-701

To date, some 50 or more cases of anaplasmosis have been treated in the field with this drug.

Accurate records of every case are not available as it was impossible to make daily visits or follow the blood pictures in many of them. In other cases supportive treatment with other drugs was administered so that the evaluation of PAA-701 in every case is difficult to ascertain.

Supportive treatment was probably not necessary in the majority of cases, but most animals belonged to farmers who could ill afford to lose them and on which experimentation would not have been justified.

Particulars of cases treated are shown in the attached table of the 27 cases. One only, in which there were complications, succumbed.

Discussion

(1) From clinical observations the original dosage of 0·1 gramme per 10 lb. bodyweight was inadequate.

A marked decrease in body temperature followed by improvement in appetite was observed in a few cases when the dosage was increased to 0·4 gramme per 10 lb. b.w. The doses were given three times daily for at least three days.

(2) It is not known whether the peripheral blood was freed of anaplasma in every instance owing to the difficulty in following up cases, and to the fact that most animals were already infested with ticks which could prove a continual source of reinfestation.

(3) No toxic effects were observed from the administration of 0·4 gramme of PAA-701 per 10 lb. b.w.

(4) It appeared that animals treated in the very early stages recovered more rapidly without exhibiting any appreciable signs of anaemia. Long-standing cases, even when the parasites appeared to be absent in the blood stream, took a much longer time to recover and were usually given supportive treatment such as arsenicals, blood transfusions and laxatives.

(5) Supportive treatment, when using PAA-701, should be directed towards combating the severe anaemia which develops in nearly 50 per cent. of the animals.

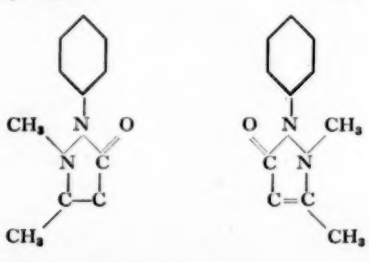
(6) Early diagnosis and treatment is of great assistance in successful treatment.

(7) From a study of blood pictures it is believed that PAA-701 has definite direct action on *Anaplasma marginale*, but no action on *Babesia bigemina*.

Acknowledgments.—Sincere appreciation is expressed to all members of the Veterinary Division, Drs. Oscar Felsenfeld, Viola M. Young and other co-workers from the Tropical Research Foundation of Chicago, Illinois, who assisted in this field programme, to Messrs. Parke Davis & Co., who generously supplied the experimental drug, and to the Director of Agriculture for permission to publish this paper.

* Camoform, Parke, Davis & Co., Michigan, U.S.A.

† Forbisen, 2, 2′, 3, 3′-Tetramethyl-l, 1′-diphenyl (4, 4′-bi-3-pyrazoline)-5, 5′-dione.



ANIMAL HEALTH TRUST
EVANS FINAL YEAR STUDENTSHIPS

For the year 1954-55 the following students have been awarded, on the recommendation of their professors, Evans Final Year Studentships, which take the form of a financial grant during the year which immediately precedes their final examinations. The awards are made having in view the student's previous work, and future potentialities.

Royal (Dick) School of Veterinary Studies, Mr. G. H. Podd; Royal Veterinary College, London, Mr. J. B. Derbyshire; University of Glasgow Veterinary School, Miss Gillian O. Wickens; Veterinary College of Ireland, Ballsbridge, Dublin, Mr. K. J. Smith; University of Cambridge, Dept. of Veterinary Clinical Studies, Miss Ursula Parsons, PH.D., M.A.; University of Liverpool, Mr. M. J. Clarkson; University of Bristol, nomination to be made at the end of September.

SUMMARY OF CASES TREATED WITH PAA–701

Date Seen	Description of Animal	Symptoms	Dosage with PAA–701	Additional Treatment	Results
1. 1.5.52	Purebred Jersey bull, eight years old.	Constipation. Extreme icterus. Anorexia. Temp. 106·2° F. Blood smears—heavy infestation.	0·1 gm. per 10 lb. bodyweight daily for three days.	Aricyl, 10 ml. on alternate days for five injections. Mineral oil. pulv. Nux Vom. and Ammon. Carb.	Temp. fell on second day to 104° F. and on fifth day to 102° F.
2. 31.5.52	South Devon bull, five years old.	Acute case. Laboured respiration. Anorexia. Anaemia Temp. 106·1° F.	ditto.	Aricyl, 10 ml. on first day. One litre of blood on first and second days.	Reported improvement on second day when bull started eating. Recovered in six days.
3. 20.6.52	Grade Jersey heifer, two years old.	Extreme icterus. Constipation.	ditto.	Aricyl, 10 ml. on alternate days for five injections. Epsom salts 1 lb. on first day.	Appeared to have recovered in seven days.
4. 21.6.52	Two grade Jersey cows, five years old.	Both cases had icterus, emaciation and temps. of 103·4° F. (chronic cases). Blood smears positive.	ditto.	Aricyl, 10 ml. on alternate days for five injections.	Recovered when seen after 10 days.
5. 27.6.52	Grade Jersey cow, four years old.	Extreme icterus. Constipation. Anorexia. Temp. 106° F.	ditto.	Aricyl, 10 ml. on alternate days for five injections. Glauber salts, 1 lb. on first day.	On second day bowels normal and temp. 105° F. On third day temp. 103° F. On fourth day 102° F. and animal feeding well.
6. 13.7.52	Grade Jersey cow, five years old.	Constipation. Icterus. Anorexia. Temp. 105·3° F. Blood smears positive.	ditto.	Aricyl, 10 ml. on alternate days for five injections. Mineral oil. pulv. Nux Vom. and Ammon. Carb.	Temp. fell to 103° F. on second day and to 102° F. on third day. Smears negative on third day. Recovered in seven days.
7. 9.8.52	Grade Jersey cow, five years old.	Icterus. Anorexia. Bowels normal. Temp. 104° F.	ditto	Aricyl, 10 ml. on alternate days for five injections.	Temp. fell to normal on second day. Eating well after third day.
8. 8.9.52	Three grade Jersey cows.	Slight icterus. Blood smears positive. Temps. 105·2° F., 105·0° F., 104·0° F.	ditto.	None.	All recovered within five days.
9. 26.9.52	Grade Jersey cow.	Icterus. Bowels normal. Temp. 104·5° F. Blood smears positive.	ditto.	None.	Recovered within five days.
10. 11.1.53	South Devon bull, two years old.	Slight icterus. Laboured respiration. Slight constipation. Refused grain but ate a little grass. Bowels normal, Temp. 105·6° F.	0·4 gm. per 10 lb. bodyweight daily for three days. T.I.D.	Aricyl, 10 ml. on alternate days for five injections. Glauber salts 1 lb. on first day.	Temp. fell to normal on second day and bull started eating well. (Note: This bull was first treated for pneumonia for two days with 3,000,000 i. units penicillin daily.)
11. 20.1.53	Grade Holstein, four years old.	Extreme icterus. Constipation. Emaciation. Heavily tick infested. Severe anaemia.	ditto.	Aricyl, 10 ml. on alternate days for five injections. Glauber salts 1 lb. on first day.	Much improved on second day, eating grass. Recovered in 15 days.
12. 29.1.53	Holstein-Jersey cow.	Icterus. Anorexia. Constipation. Fairly good condition. Smears—heavy infection. Temp. 103·6° F.	ditto.	Acetylarsan, 10 ml. on first day and 1 lb. Glauber salts on second day.	Temp, bowels, and appetite normal on third day. Smears negative on fourth day. Recovered in five days.
13. 19.2.53	Nondescript red cow.	Icterus. Anorexia. Constipation. Poor condition, just calved. Smears heavily infected. Temp. 104·2° F.	ditto.	First day 1 lb. Glauber salts. One litre blood on third, fourth, sixth and seventh days. 300 ml. dextrose saline on fifth day. Aricyl, 10 ml. on fourth and seventh days. Acetylarsan 10 ml. on 8th, 10th, 12th, 20th, 22nd, 24th, 26th and 28th days.	Smears positive on 5th, 10th and 22nd days. Icterus present till 20th day. Dung soft on fourth day. Temp. normal (100·6° F.) on fifth day. Appetite remained poor and symptoms of nephritis developed on 22nd day. Destroyed on 24.3.54 (36th day) due to complications. N.B.—the amount and quality of fodder during treatment was very poor.

(*Continued overleaf*).

Date Seen	Description of Animal	Symptoms	Dosage with PAA–701	Additional Treatment	Results
14. 28.2.53	Grade Jersey cow.	Good condition. Constipation, Slight icterus. Smears—fair infection. Temp. 101·8° F. Anorexia.	0·4 gm. per 10 lb. bodyweight for three days. T.I.D.	Glauber salts, 1 lb. on first day.	Smears negative on sixth day. Temp. 103·6° F. on third day, 101·5° F. on sixth day and ensuing days. Appetite regained on fifth day. Bowels improved from fourth day onward.
15. 29.2.53	Grade Jersey cow.	Poor condition. Icterus. Constipation. Anorexia. Smears—heavy infection. Temp. 104·0° F.	ditto.	Glauber salts 1 lb. on first and third days. One litre blood on 4th, 5th, 7th, and 28th days. Acetylarsan 10 ml. on 4th, 6th, 8th, 10th, 12th, 20th, 22nd, 24th, 26th, and 28th days. Dextrose saline 300 ml. on 6th day.	Smears positive on 4th, 10th and 28th days. Negative on 6th and 35th days. Temp. fell steadily to 101·6° F. on sixth day and remained normal.
16. 2.3.53	Grade Jersey cow.	Fair condition. Dung normal. Slight icterus. Temp. 104·8°F. Calved two days previously. Smears fair infection.	ditto.	None.	Temp. and urine normal on 4th day. Blood smears negative on 4th day.
17. 12.3.53	Grade Jersey Cow.	Fair condition. Constipation. Slight icterus. Anorexia. Smears — fair infestation. Temp. 104·2° F.	ditto.	Glauber salts 1 lb. on first day.	Smears negative and temp., urine and appetite normal on third day.
18. 2.4.53	Grade Jersey bull calf.	Anorexia. Animal recumbent. Icterus. Smears—19% R.B.C's infected. Slight anisocytosis, marked poikilocytosis. Temp. 105·6° F. Constipation.	ditto.	None.	Bowels normal on second day, but icterus still present. Third day—1% R.B.C's. infected and some anisocytosis. Complete recovery in five days.
19. 2.4.53	Grade Jersey cow.	Anorexia. Animal recumbent with laboured respiration. Temp. 106·0° F. Smears—12% R.B.C's. infected.	ditto.		Second day animal up and appetite improved, but still very anaemic. Third day, 0·5% R.B.C's. infected. Complete recovery in five days.
20. 2.4.53	Grade Jersey cow.	Anorexia. Icterus. Bowels normal. Laboured respiration. Temp. 105·0° F. Smears—1% R.B.C's. infected.	ditto.		Greatly improved on second day. Recovery in five days.
21. 6.6.53	Grade Jersey cow (same animal as No. 17) relapse.	Poor condition. Constipation. Icterus. Anorexia. Fair tick infestation. Smears—fair infection. Temp. 104·0°F.	ditto.	Glauber salts, 1 lb. on third day.	On third day, 3% R.B.C's. On fourth day five per 1,000 R.B.C's. infected and one per 1,000 showed piroplasms on fifth and seventh days. Anaplasms one per 1,000 R.B.C's piroplasms also one per 1,000. Smears negative on 14th day. Appetite normal on third day. Temp. normal on fifth day.
22.	Jersey type bulkin 700 lb. wt.	Anorexia, Icterus. Bowels normal. Sick less than 24 hours.	0·2 gm. per 10 lb. bodyweight on first day. 0·1 gm. per 10 lb. bodyweight on second and third days.		Feeding at four days but icterus lasted for seven days.
23. 5.7.53	Grade Jersey heifer 450 lb. wt.	Sick one day before treatment.	30 daily in two doses for three days.	Aricyl 10 ml. morning and evening. Red drench, two doses morning and evening.	Recovered.
24. 7.10.53	Jersey type two years three months. 400 lb.	Condition fair. 1·4% R.B.C's infected. Animocytosis, poikilocytosis and basophillic stippling. Temp. 105·8° F.	10 gm. at one dose on first day. Then five gm. twice daily for next four days.	Acetylarsan 10 ml. on second, fourth and fifth days.	Condition picked up markedly on fourth day when temp. fell to 101.8° F. and anaplasms to 0·2%. Discharged on 10th day.

ABSTRACTS

FAO/WHO Committee on Brucellosis*

This second report, which is complementary to the first (*WHO tech. Rep. Ser.* 1951. **37** or *FAO Agri. Stud. No.* 14), stresses the fact that the basis of the control of human brucellosis lies in the control and eradication of the disease in animals since contact with infected animals and infected materials of animal origin remain the most important sources of infection.

The improvement in the control of bovine brucellosis and the heat treatment of milk and its products have reduced *Br. abortus* infection in human beings, but, unfortunately, the same is not true of *Br. melitensis.*

The major part of the report sets down in a clear and concise manner the known facts relating to the clinical manifestations, diagnostic methods, therapy and vaccination in both man and animals. Other sections deal with isolation and identification of brucella and the standardisation and interpretation of the sero-agglutination test. The report draws attention to those aspects of brucellosis urgently in need of further research.

In an annexe to the report there are short notes on the whey agglutination test ; the use of stained antigen with goats' milk and dissociation of brucella. There is also a world-wide address list of many laboratories working on brucellosis problems. J. S. P.

* **Joint FAO/WHO Expert Committee on Brucellosis. Second Report.** (1953). *FAO Agricultural Studies No.* 24.

* * * * *

The Probability of Brucellosis Eradication in Denmark*

The use of the ABR (milk ring test) was officially recognised in 1946 as a diagnostic means of detecting herds affected with brucellosis. The number of registered brucellosis-free herds has risen from 7·7 per cent. in April, 1946, to 77·5 in January, 1952. Taking progress in the Island of Bornholm (the worst infected area in Denmark) as a yardstick, statistical examination of the results to date indicates that brucellosis should be eradicated from Denmark in 1961, assuming that the campaign against the disease is maintained at a high level.

J. S. P.

* **On the Probability of Total Eradication of Brucellosis in Denmark.** Bruhn, P. A. (1953). *Proc. XV Int. vet. Cong. Stockholm.* **1.** 105.

* * * * *

Assessment of Brucellosis Immunity in Cattle*

The steps leading up to the establishment, in 1935, of the Agricultural Research Councils Field Station at Compton are described. The results of the experiments on brucellosis carried out at the station over the intervening years, by various workers, are summarised and the basic principles of the assessment of the efficiency of the vaccines are described. Briefly these involve :—

1. Rearing of cattle in a brucella-free environment.
2. Transference to special isolation buildings and division into vaccinated and control groups.
3. Infection by the conjunctival route during fifth month of pregnancy.
4. Bacteriological examination of tissues and colostrum at abortion or calving.
5. Examination of post-partum milk samples.

Experiments carried out at the station and elsewhere up to 1944 led to the adoption of Strain 19 for general use in Great Britain.

* **The Assessment of Brucellosis Immunity in Cattle.** Gordon, W. S. (1953). *Proc. XV Int. vet. Cong. Stockholm.* **1.** 87.

The work at present in progress with Strain 19 vaccine is designed to determine the degree and duration of immunity (from first to sixth pregnancy) following single and multiple vaccinations with Strain 19 and involves the use of 584 cattle. This experiment which started in 1949 is not expected to be completed till 1956. J. S. P.

NOTES AND NEWS

Diary of Events

Sept. 4th.—R.A.V.C. " One Day Event " at Melton Mowbray, commencing 9 a.m.

Sept. 8th.—General meeting of the Lancashire Division, B.V.A., at Booth's Café, Preston, 3 p.m.

Sept. 14th.—Combined Summer Meeting of the East Midlands and South-East Midlands Divisions, B.V.A., at the Veterinary Science Division Laboratories, Boots Pure Drug Co., The Priory, Thurgarton, 1.15 p.m.

Sept. 19th—25th.—72nd Annual General Meeting and Congress of the British Veterinary Association at Torquay.

Sept. 30th.—Meeting of the Essex Veterinary Society at the Essex Institute of Agriculture, Writtle, 7.30 p.m.

Nov. 16th & 17th.—B.V.A. Conference on the Feeding of Farm Livestock for Health and Production in the South Hall, Victoria Halls, Bloomsbury Square, London, W.C.1.

* * * * *

PERSONAL

Births.—Arnold.—On August 16th, 1954, to Prudence, wife of Roger Arnold, B.Sc., M.R.C.V.S., Superintendent, Livestock Services, Jamaica—a daughter.

Briggs.—At The Hill Nursing Home, Reading, on August 26th, to Mary Briggs (*née* Cawthorn), PH.D., B.Sc., wife of Clive A. E. Briggs, PH.D., M.R.C.V.S., a son, Martin Clive Elston.

Green.—On July 7th, 1954, at Bury St. Edmund's, Suffolk, to Patricia, wife of Leslie H. Green, M.R.C.V.S., a son—Jonathan, a brother for Robert.

Hutchings.—On August 8th, 1954, at Mongu, Northern Rhodesia, to Vivien (*née* Jenner), wife of D. A. Hutchings, M.R.C.V.S., a son—Christopher Edward.

Stockman.—On August 23rd, 1954, at Victoria Hospital, Barnet, to Valerie Stockman, B.Sc., M.R.C.V.S., wife of Michael Stockman, M.R.C.V.S., a son—Andrew John.

* * * * *

APPOINTMENTS IN THE UNIVERSITY OF CAMBRIDGE

The following appointments have been announced in the Department of Animal Pathology, University of Cambridge :—

Stuart D. Elliott, M.B., B.Sc. (Lond.), M.A. (Cantab.), M.D. (Lond.), D.P.H., Assistant Director of Research.

M. A. Soltys, B.V.Sc., Dr. Med. Vet., PH.D. (Edin.), Lecturer in Veterinary Bacteriology.

E. J. L. Soulsby, PH.D. (Edin.), M.R.C.V.S., D.V.S.M., Lecturer in Veterinary Parasitology.

P. Whittlestone, B.Sc. (Lond.), M.R.C.V.S., Demonstrator in Morbid Anatomy.

These appointments will take effect as from October 1st, 1954.

* * * * *

SHIPLEY BOWLS CUP

The Annual Bowls Competition for the Shipley Cup was held by the Eastern Counties Veterinary Society at Colchester on Friday, August 27th. The cup was won by Major W. H. Wortley, of Bungay, who in the final beat Mr. C. T. Murphy (Colchester), a former winner of the competition.

LIVESTOCK DISEASE IN EIRE

It has recently been stated by the veterinary section of the Eire Department of Agriculture that the cost of livestock diseases has been estimated at £19,000,000 a year. This sum is said to be equal to the value of the entire national output of poultry and eggs.

* * * * *

MYXOMATOSIS

It is reported in the Press that in order to alleviate suffering the Queen has given instructions that keepers in Windsor Great Park should arrange regular patrols for the purpose of destroying rabbits which have contracted myxomatosis.

The disease has been confirmed on the Royal estate at Sandringham and has now spread across Norfolk from east to west, involving more than 60 parishes.

Writing in his monthly diocesan letter the Archbishop of York deplores the deliberate infection of rabbits. While rabbits are admittedly a pest and need to be reduced in numbers, the Archbishop feels that it should not be necessary to cause them the suffering brought about by myxomatosis. The disease, in his view, could possibly have unexpected and undesirable results on other animals, and he refers to its deliberate spread as "inhuman and un-Christian."

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Gloucs.—Manor Farm, Cutsdean, Cheltenham (Aug. 25).
Salop.—Irelands Cross Farm, Woore (Aug. 24).
Sussex.—Huddlestone Farm, Steyning (Aug. 25).
Warwicks.—91, Clarence Road, Four Oaks, Sutton Coldfield (Aug. 27); The Firs, Nether Whitacre, Coleshill, Birmingham (Aug. 28).
Yorks.—Styche's Cottage, Burton Constable, Coniston, Hull (Aug. 23); Shugden Head Farm, Amblerthorne, Halifax (Aug. 25); Arram Hall, Becoholme, Driffield (Aug. 27); Ember Hill Farm, Shipton by Beningbrough (Aug. 28).

FOWL PEST:

Essex.—St. Helena, Perry Street, Billericay (Aug. 25).
Flints.—Broughton Lodge, Threapwood, Malpas (Aug. 24).
Herts.—Cross Farm, Bovingdon, Hemel Hempstead; Milbaise Nurseries, Tower Hill, Chipperfield, Kings Langley (Aug. 26); End Bungalow, New Road, Tower Hill, Chipperfield, Kings Langley (Aug. 28).
Norfolk.—Cobholm Allotments, Great Yarmouth (Aug. 23).

SWINE FEVER:

Cambs.—The Limes, Landbeach (Aug. 27).
Ches.—Heys Farm, Heys Lane, Romiley, Stockport (Aug. 26).
Denbighs.—Holt Lodge, Hugmore Lane, Wrexham (Aug. 25).
Devon.—Barntown, Broadwood Kelly, Winkleigh (Aug. 27).
Essex.—Burnt Ash Farm, Colchester Road, Wix, Manningtree (Aug. 25); Carrisbrook Farm, North Weald, Epping (Aug. 27); Hall Farm, Ardleigh, Colchester (Aug. 28).
Flints.—The Piggery, Pentre, Sandycroft (Aug. 26).
Gloucs.—Podswell Barn, Edge, Painswick, Stroud; High Worlaston Farm, Lydney (Aug. 23); Hill Farm, Hartley, Leckhampton, Cheltenham (Aug. 26).
Kent.—Orchard House, Rainham, Sittingbourne (Aug. 27).
Lancs.—The Piggery, Sherwoods Lane, Aintree, Liverpool (Aug. 23); Red Bank Piggeries, Winwick Road, Newton-le-Willows (Aug. 27).
Lincs.—West Farm, Wintringham, Scunthorpe (Aug. 23); Frampton Fen, Hubberts Bridge, Boston (Aug. 27); Station Farm, Navenby (Aug. 27).
Monmouth.—Clytha Farm, Clytha, Abergavenny (Aug. 23); The Piggery, St. Cadoc's Hospital, Caerlon, Newport; Hillside, Llangwm, Usk (Aug. 26).
Montgomery.—Penysarn Farm, Berriew (Aug. 28).
Salop.—Cantlop Mill Farm, Berrington, Shrewsbury (Aug. 25); Withyford House Farm and Withyford Heath Farm, Shrewsbury (Aug. 27); Edgebold, Shrewsbury (Aug. 28).
Somerset.—Northlease Farm, North Cadbury, Yeovil (Aug. 26).
Suffolk.—White Post Farm, Bramfield, Halesworth (Aug. 27).
Warwicks.—Home Farm, Wimpstone, Stratford-on-Avon (Aug. 23); 38, Leaford Road, Yardley, Birmingham, 26 (Aug. 27).

CONGRESS GOLF COMPETITIONS

Entries for the ladies' competition for the "Dunkin" Trophy, and the men's competition for the "Simpson" Trophy should be sent to Mr. A. Smith, M.R.C.V.S., Rosslyn, Torquay Road, Paignton, South Devon, who is in charge of the arrangements. Time has been provided for these competitions to be played on Thursday afternoon, September 23rd, over the Churston Golf Club's course.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

A LEGITIMATE GRIEVANCE

Sir,—I was interested, and hopeful, to read your article "A Legitimate Grievance" in a recent *Record*. Is it possible that at last some publicity is going to be given to the unique injustice from which small-animal practitioners suffer?

The number of animal clinics is increasing throughout the country. In some towns they are so numerous that there is the luxury of considerable choice for "animal lovers" who are unable, or *unwilling*, to spend a little money on their pets. It is difficult to believe that in the present state of full-employment in this country there are so many "poor" people that such vast organisations are needed for the treatment of their animals. When one considers the spending habits of even "working people" and the thriving state of luxury trades it appears impossible that so many cannot afford a modest fee to a private veterinary surgeon.

In my own practice the commonest fee is 5s., the next 6s., a moderate number of clients spend 7s. 6d. and only one client in nine is asked to pay more than 12s. 6d. Is Britain in such a poverty-stricken state that only a smallish percentage of the population can afford these fabulous charges?

In my own town there are three free clinics within 1½ miles of my surgery. In one morning nine people with animals were seen to enter one clinic, five another, and four another. Supposing a fairly high percentage of these people were genuinely poor, say 25 per cent., it still leaves 12 people who might have spent a few shillings in a private surgery and thus helped a private practitioner to earn a decent living and improve his equipment.

Better-off people who attend clinics and give large donations should remember that out of the kindness of their hearts, towards animals, they may be directly contributing to the hardships of a veterinary surgeon who has proved his interest and affection for animals by a long and expensive course of professional study.

I do not necessarily blame the clinics in view of the difficulty in almoning. If mean people take advantage of the clinics it is not always the officials who are tc blame. Certainly there appears to be an excessive number of clinics, and I understood that the Committee which studied the matter recommended that there should be no overlapping. I cannot say I have noticed clinics being closed, however.

It would appear that the present position of the small-animal practitioner is unique in this country in that he has no defence whatever against "free" competition. And as an individual he cannot appeal to the public for a square deal.

If it were possible for a body such as the B.V.A. to give publicity to this gross injustice it might be that the better part of the British public would realise that "kindness to animals" may amount to "cruelty to the vet." And it might inspire some hope that the small-animal practitioner is not to be forever the Cinderella of the profession.

I am sorry to write at such length on this matter but so few opportunities arise for the airing of this "genuine grievance."

Finally a request. I hate anonymous writers but it was my experience some years ago that by raising this matter I antagonised certain free clinic organisers and added to my private difficulties. So please allow me to remain anonymous in the meantime. If other practitioners take up the matter I shall be delighted to revert to my usual practice of speaking my mind in my own name.—Yours faithfully, VETERINARY VICTIM. *August 21st*, 1954.